

# **FOREST PEST CONDITIONS IN THE NORTHEAST 1972**



U.S. DEPT. AGRICULTURE - FOREST SERVICE  
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY  
UPPER DARBY, PA. APRIL 1973

# FOREST PEST CONDITIONS IN THE NORTHEAST—1972<sup>1</sup>

Edited by

A. R. Hastings and J. T. O'Brien<sup>2</sup>

## CONTENTS

CONDITIONS IN BRIEF .....	1	European pine sawfly .....	10
STATUS OF INSECTS .....	2	Loblolly pine sawfly .....	10
Hardwood Defoliators .....	2	Redheaded pine sawfly .....	11
Gypsy moth .....	2	Red pine sawfly .....	11
Red-humped oakworm .....	3	Larch sawfly .....	11
Variable oak leaf caterpillar .....	4	Yellowheaded spruce sawfly .....	11
Saddled prominent .....	5	Hemlock looper .....	11
Large aspen tortrix .....	5	Pine looper .....	11
Oak leaf rollers and tiers .....	5	Bagworm .....	11
Fall and spring cankerworms .....	7	Arborvitae leaf miner .....	11
Forest tent caterpillar .....	7	Nantucket pine tip moth .....	12
Eastern tent caterpillar .....	7	Pine tussock moth .....	12
Aspen blotch miner .....	7	Conifer—Insects (Other) .....	12
Birch casebearer .....	7	Red pine scale .....	12
Birch leaf miner .....	7	Saratoga spittlebug .....	12
Bruce spanworm .....	7	Balsam woolly aphid .....	12
Cherry scallop shell moth .....	7	Pine root collar weevil .....	12
Elm spanworm .....	8	Pine root weevil .....	12
Fall webworm .....	8	Southern pine beetle .....	12
Locust leaf miner .....	8	White pine weevil .....	13
Maple leaf cutter .....	8	STATUS OF DISEASES .....	14
Maple trumpet skeletonizer .....	8	Annosus root rot .....	14
Mountain ash sawfly .....	8	White pine decline .....	14
Orange-striped oakworm .....	8	Armillaria root rot .....	14
Oak skeletonizer .....	8	Oak wilt .....	14
Post-oak locust .....	8	Dutch elm disease .....	14
Satin moth .....	9	Anthracnose .....	15
Walkingstick .....	9	Brown spot needle cast .....	15
Walnut caterpillar .....	9	Rhizosphaera needle cast .....	15
Hardwood—Bark Beetles and Others .....	9	Lophodermium needle cast .....	16
Native elm bark beetle .....	9	White pine blister rust .....	16
A walnut weevil .....	9	Scleroderris canker .....	17
Conifer Defoliators .....	9	Hypoxylon canker of aspen .....	18
Spruce budworm .....	9	Sirococcus shoot blight of red pine .....	18
Jack pine budworm .....	10	Air pollution damage .....	18
Jack-pine sawfly .....	10	Weather damage .....	18

<sup>1</sup>Report compiled from information submitted by Federal, State and Private cooperators in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia and Wisconsin.

<sup>2</sup>Entomology Section Head, and Pathologist, respectively, St. Paul Field Office, St. Paul, Minn. 55101.

## CONDITIONS IN BRIEF

Defoliators were again the major insect pests in the Northeastern states in 1972. Defoliation of hardwood forests occurred on over 4,385,000 acres, with gypsy moth, red-humped oakworm, variable oak leaf caterpillar and large aspen tortrix the primary species involved.

Gypsy moth defoliation occurred most severely in Connecticut, Rhode Island, eastern New York, eastern Pennsylvania and in New Jersey. Suppression projects on 174,189 acres were conducted to reduce high larval populations in areas of high value forested properties in the four states. Incidence of gypsy moth males in trapping programs show a continued spread southward into Delaware, Maryland, Virginia and westward into western Pennsylvania and Ohio. Isolated incidence of gypsy moth have been recorded in Missouri, Michigan, Minnesota and Iowa.

The red-humped oakworm — variable oak leaf caterpillar complex occurred throughout the Lake States with the largest single area of severe defoliation occurring in west central Michigan. Private companies in Michigan treated residential areas to reduce the bothersome larval population. Populations of variable oak leaf caterpillar reported from Missouri last year collapsed in 1972.

The large aspen tortrix continued its infestations in the northern parts of the Lake States and occurred over much of northern Maine in 1972.

Spruce budworm remains the primary defoliator of conifers, affecting more than 4 million acres, in northern Maine and northern Minnesota. Smaller infested areas in northern Michigan and Wisconsin are also present. Suppression activities were undertaken to reduce possible tree mortality in Maine on 500,000 acres using 0.15 lbs. of Zectran per acre.

A pine looper infestation on Cape Cod, Massachusetts, nearly quadrupled in size of acreage infested from 11,000 acres in 1971

to 42,700 acres in 1972. Control was undertaken on 13,000 acres.

The major outbreak of southern bark beetle in 1971 on the Delmarva Peninsula declined substantially this season but some loblolly pine mortality is still occurring.

Tree diseases continue to have their effect on forest land management for timber production and recreation usage. Dutch elm disease increased in severity in several areas and continues to spread in Minnesota and Wisconsin. Oak wilt appears to have reached a point of stability over much of its range. Scleroderris canker has been found in plantations in northeastern New York where it is killing large Scotch and red pine. In the Lake States, where the disease was first found, the spread and mortality in plantations of red pine appear to be at about the same level as previous years. Annosus root rot, while still causing damage in New England, appears to have declined in incidence elsewhere within its range. Sirococcus shoot blight (Deerskin droop) has increased materially in infested stands with red pine reproduction under infected saw-timber sized trees suffering most severely.

White pine blister rust continues to be present in white pine areas. A monitoring program has been developed to detect increases in rust infection. The overall program has been reduced as a result of an extensive evaluation conducted on State and private ownership land over the past several years. Pruning guidelines to reduce incidence in stands of young white pine in areas of moderate and high hazard have been developed.

Air pollution continues to be a problem in some localized areas near industrial development. This pollution incidence affects both hardwood and conifer species.

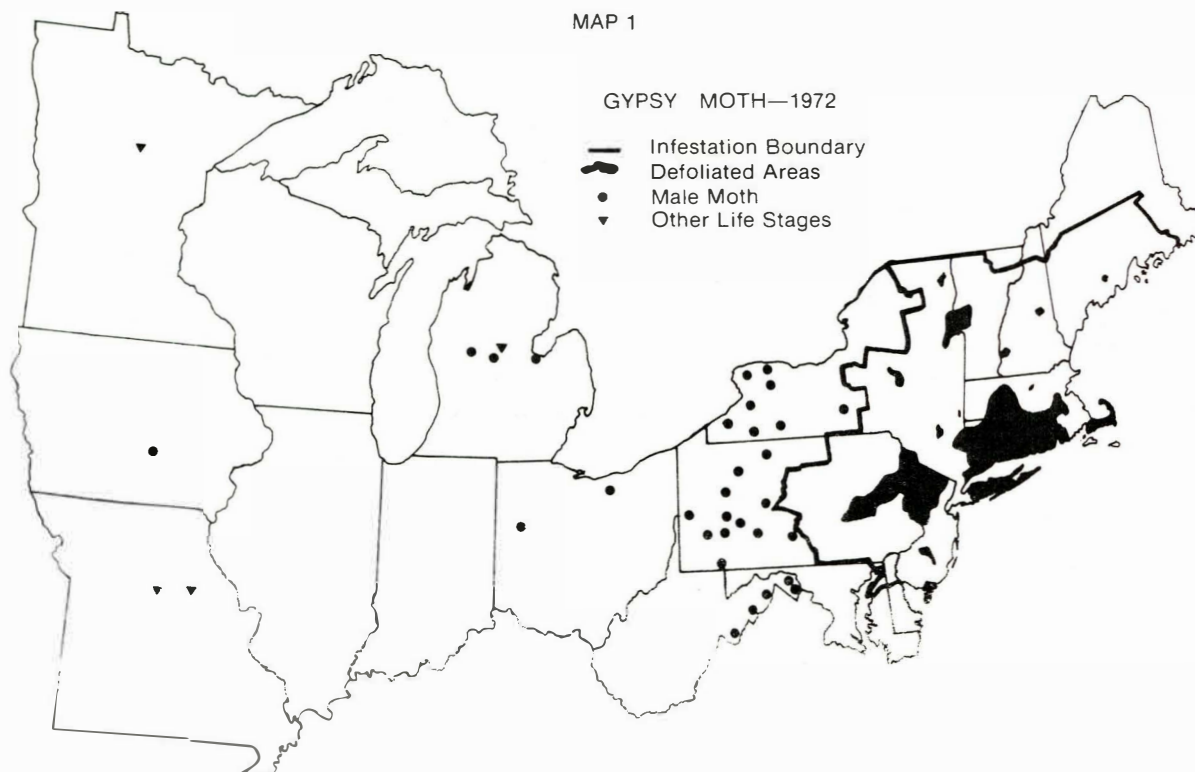
Weather affected many hardwood and conifer species with a late spring frost in June killing much of the tender foliar growth across the northern area of the Lake States.

# STATUS OF INSECTS HARDWOOD DEFOLIATORS

## Gypsy moth

*Porthetria dispar* (Linnaeus)

MAP 1



GYPSY MOTH continues to be one of the prominent hardwood defoliators in the north-eastern part of the Area. Total acreage defoliated decreased in 1972 as shown by the following:

States	Acres Defoliated		Acres Treated	
	1971 <sup>3</sup>	1972 <sup>4</sup>	1971 <sup>3</sup>	1972
Connecticut .....	655,100	513,880	47,000	—
Maine .....	820	40	—	—
Massachusetts .....	18,800	20,480	—	—
New Hampshire .....	3,300	200	—	—
New Jersey .....	180,600	226,140	55,000	50,172 <sup>5</sup>
New York .....	479,150	177,605	241,000	41,279 <sup>5</sup>
Pennsylvania .....	89,000	404,060	23,000	20,400 <sup>5</sup>
Rhode Island .....	8,500	22,510	5,900	58,968 <sup>6</sup>
Vermont .....	4,500	4,215	—	—
Total acreage .....	1,439,770	1,369,130	371,900	174,189

<sup>3</sup> Forest Insect and disease conditions in the United States, 1971 U.S. Dept. of Agric. Forest Service—p. 55.

<sup>4</sup> Data from correspondence E. G. Warner to D. R. Shepherd, Oct. 6, 1972.

<sup>5</sup> USDA Draft Environmental Impact Statement on the Cooperative 1973 gypsy moth suppression and regulatory programs, p. 5.

<sup>6</sup> Reported by Portsmouth Field Office. USFS Northeastern Area Forest Pest Management.



This insect has been a major concern of forest land owners in New England and adjacent States since its introduction in 1869 and spread from Massachusetts. Being an exotic species in the New England environment during its early period of activity, it did not have natural control factors to hold it in check. During the past year, control operations on 174,189 acres were conducted. The reduction, by more than 50%, from 1971 of acreage treated is an expression of more stringent controls to utilize pesticides only in those situations where high forest or urban values are of concern. As in 1971, Carbaryl<sup>7</sup> was the primary insecticide used. Small acreages were treated with trichlorfon<sup>7</sup> (3,000 acres) and *Bacillus thuringiensis* (1,800 acres) in test programs.

Extensive trapping by Animal and Plant Health Inspection Service (APHIS) revealed considerable extension of catches of male moths in areas west and south of the generally infested zone (Map 1). Long distance spread was found to be accomplished by recreational vehicles travelling from the general area of infestation in the East. A single female adult was reported in Minnesota within a camper trailer from New Jersey. A house trailer was found with an egg mass and young larvae in Missouri. A male moth was trapped in central Iowa. Male moths were trapped in three counties in central Lower Michigan (Isabella, Bay and Mescosta Counties) and in Maryland and Delaware. Subsequent surveys in Isabella County indicate an established infestation. The Plant Protection and Quarantine Programs of APHIS has reported the infestation to cover approximately 35 acres with high numbers of egg masses. Several thousands of acres surround this hot spot with lower egg mass populations. An eradication program is being planned. Viable egg masses were found in camping trailers in Jackson and St. Clair

Counties in Michigan. In Lorain County, Ohio, surveys following the trapping of a male moth this summer revealed evidence in adjacent trees and wood piles of an egg mass, larval molt skins and empty pupal cases. A total of 7 male moths were trapped at this location of a recreational vehicle sales and storage yard. An eradication program for this small infestation is being planned. No further infestations have been detected away from this local spot.

Population levels in 1973 are expected to remain about the same as in previous years in areas of general infestation. An expansion of the general infestation is expected to the south and west of the currently-infested area. Small localized infestation removed from the generally infested area can be expected to occur due to transport of living gypsy moth life stages on recreation vehicles and other transported freight. Permanent establishment of isolated small infestations may be difficult for the moth.

### **Red-humped oakworm**

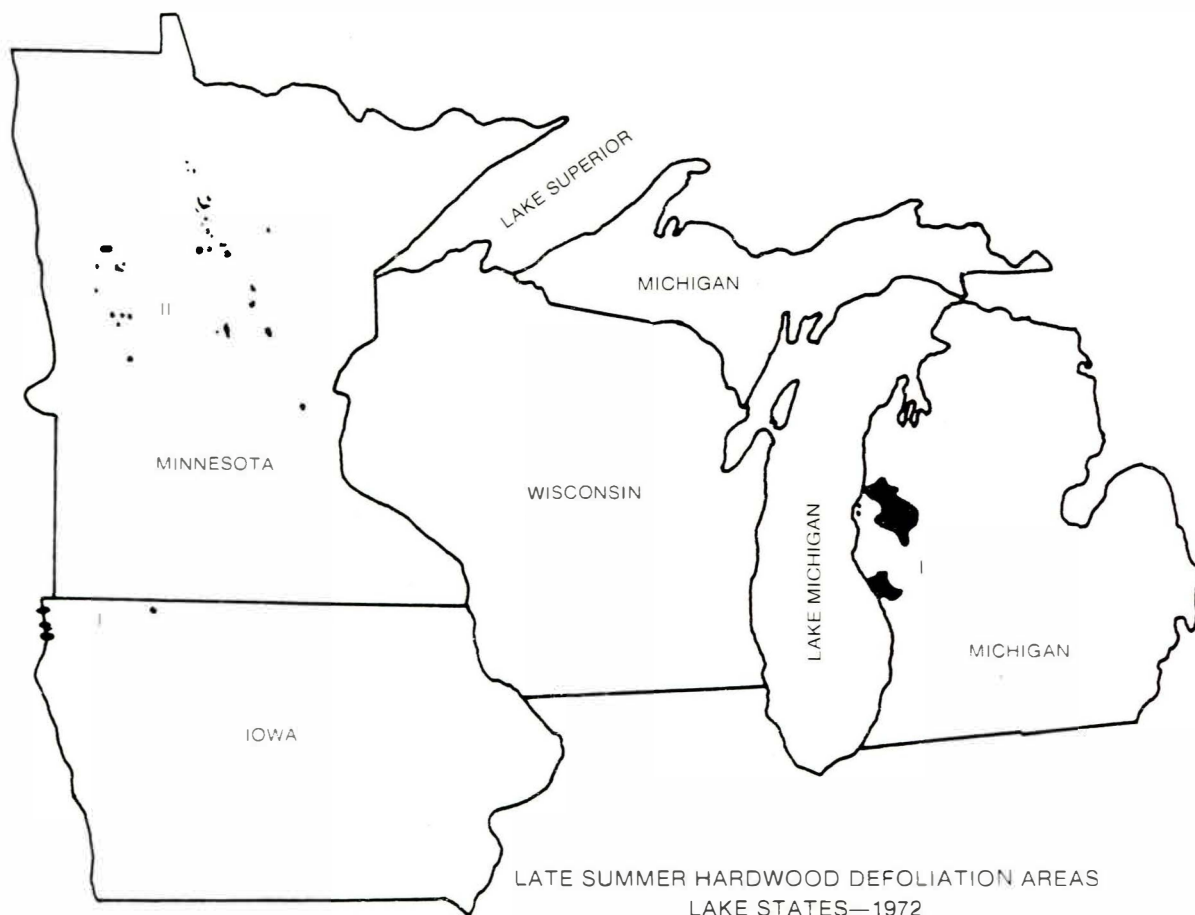
*Symmerista canicosta* (Franclemont)

Red-humped oakworm caused severe defoliation in western Lower Michigan (Map 2) for the third consecutive year. The total acreage in Michigan, about 600,000 acres, includes 400,000 of severely defoliated oak. Applications of Carbaryl<sup>7</sup> by private individuals reduced the nuisance of high larval populations around homes and recreation resort areas. A small field test by helicopter application was conducted using Dipel® (*Bacillus thuringiensis*) in the Michigan infestation. Results of this small test appear promising and further field testing is planned in 1973. In the completely defoliated areas, starvation of larvae may cause population decline. Pupal counts this fall indicate probable continuation of the outbreak in the peripheral areas of this year's complete defoliation. The oakworm outbreak in Iowa of 1,000 acres in 1971 expanded to 5,000 acres in 1972. This outbreak is expected to continue to infest oak type areas in western Iowa in 1973.

---

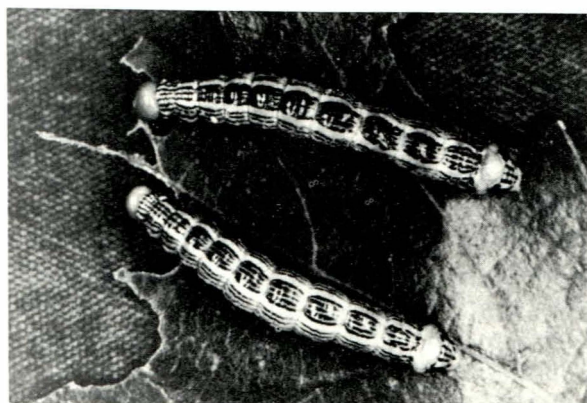
<sup>7</sup>The use of trade, firm or corporation names in this publication is for the convenience of the reader. Such use does not constitute an official endorsement or approval by the United States Department of Agriculture of any product or service to the exclusion of others which may be suitable.

MAP 2



LATE SUMMER HARDWOOD DEFOLIATION AREAS  
LAKE STATES—1972

- I Red-humped oakworm
- II Defoliator complex of species



Larvae of the red-humped oakworm. Swellings at the tail end are reddish-orange color.



Public information sign used on the Manistee National Forest at locations of high visitor use to explain the severe oak defoliation.



### Variable oak leaf caterpillar

*Heterocampa manteo* (Doubleday)

The large outbreak in southeastern Missouri in 1971 collapsed due to natural factors in 1972. The major cause for the collapse is reported due to parasite activity of a species within the genus *Telenomus* (Hymenoptera). No defoliation is expected in 1973. Populations in scattered infestations in Wisconsin in 1971 also collapsed during the 1972 season.



Variable oak leaf caterpillar. Color yellow-green with variable pattern of pink to red designs on the dorsal surface.

In Minnesota this species together with several other Notodontidae and the red-humped oakworm continued to cause defoliation in late August and September. The total acreage declined from 750,000 acres to about 40,000 acres for the entire species complex (Map 2). Variable oak leaf caterpillar populations collapsed in late August. Other species in the complex in appreciable numbers were: orange-humped mapleworm (*Symmerista leucitys* Franclemont), camouflaged caterpillar (*Dicentria lignicolor* [Walker]), orange-striped oakworm (*Anisota senatoria* [J. S. Smith]) and yellow-necked caterpillar (*Datana ministra* [Drury]).

Some localized areas of defoliation are expected in 1973 resulting from residual populations of this species complex.

### Saddled prominent

*Heterocampa guttivitta* (Walker)

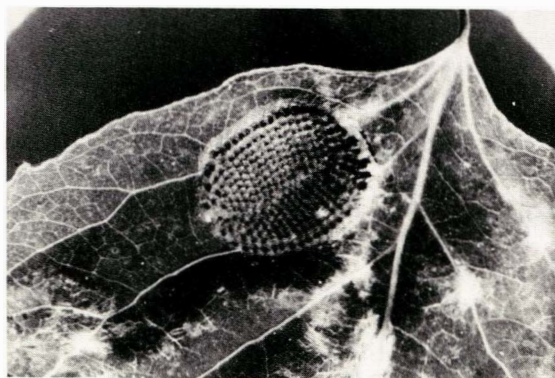
The large outbreak of this species in New England and New York has declined and appears to be over. From about a half million

acres defoliated in 1971 damage has declined to a few thousand acres in 1972. The small outbreak in Michigan has completely collapsed. Pennsylvania reports about 15,000 acres with light to moderate defoliation. Massachusetts reported only a few small patches of defoliation. New York reports that the saddled prominent and the green-striped mapleworm, *Anisota rubicunda*, (Fabricius) defoliated approximately 5,000 acres in Green County.

### The large aspen tortrix

*Choristoneura conflictana* (Walker)

The large aspen tortrix has caused moderate to severe aspen defoliation across the northern portion of the Lake States area (Map 3) and over the northern two thirds of Maine. The gross area involves about 2 million acres in the Lake States. Population levels appear to be decreasing in the Lake States and reduced levels of defoliation are expected in 1973. No tree mortality has been attributed to the four years of defoliation of aspen in the Lake States. In Maine the acreage of visible defoliation increased in 1972. Probable increase in population levels may occur in Maine in 1973.

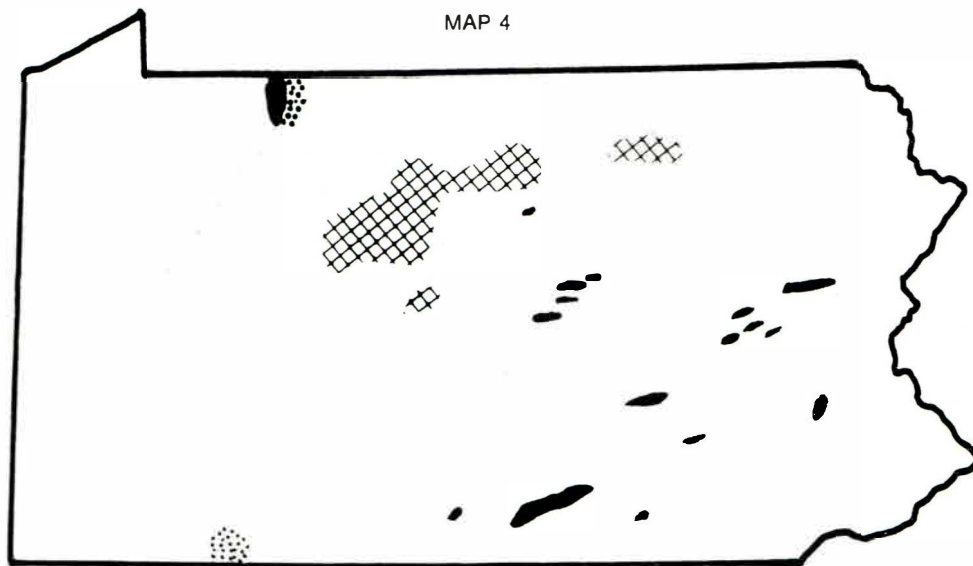
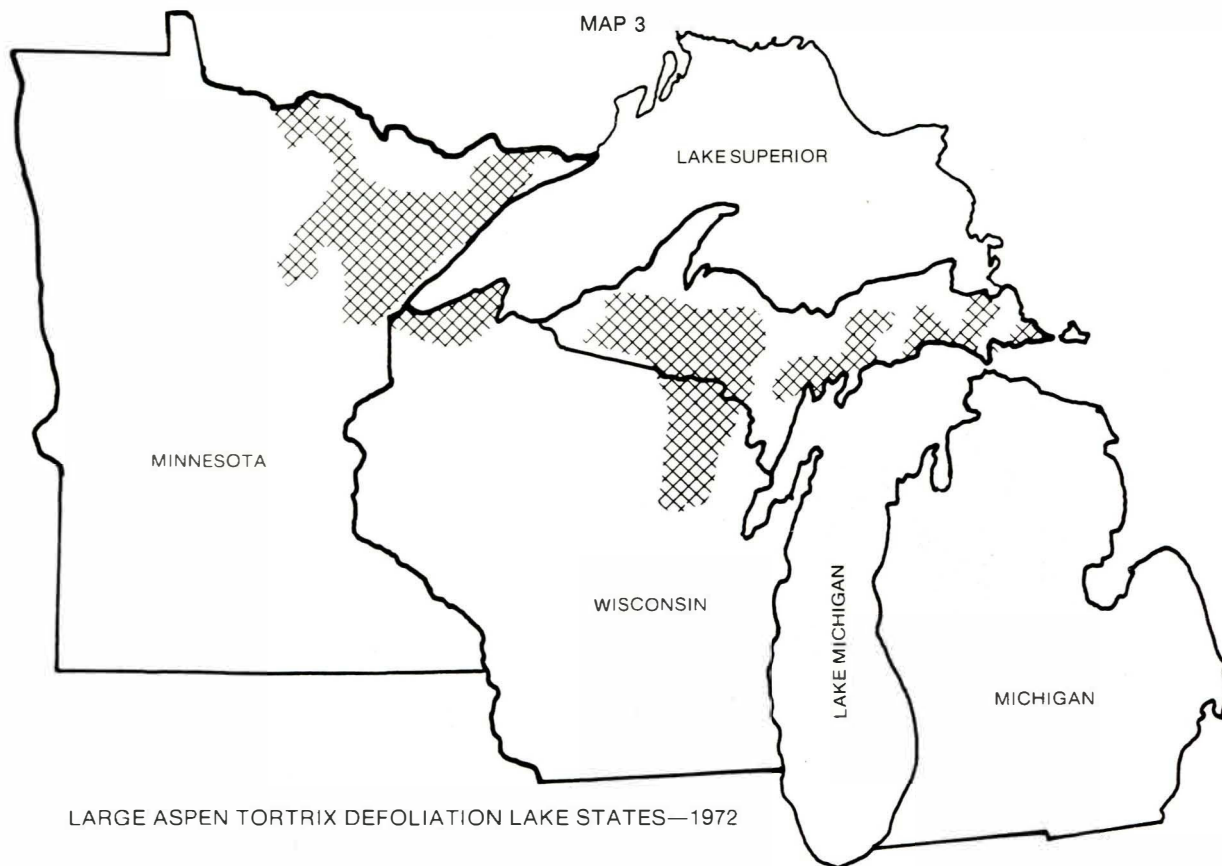


Large aspen tortrix egg mass showing the dark heads of the developing larvae a few days before hatching.




### Oak leaf roller and tiers

#### A complex of tortricid moths

Oak Leaf Roller and Tiers — A complex of Tortricid moths: *Archips semifervans* (Walker), *A. argyrospilus* (Walker) and *Croesia albicomna* (Clemens) caused defoli-



DEFOLIATION BY INDICATED SPECIES IN PENNSYLVANIA, 1972

	Fall Cankerworm	12,000 ac. Moderate to Severe
	Oak Leaf Roller	224,000 ac. Moderate 385,000 ac. Severe
	Oak Leaf Tier	18,200 ac. Moderate 41,000 ac. Severe



ation in Pennsylvania, Michigan and Wisconsin. Outbreaks of *A. semiferranus* (Walker) appear to be on the decline in Pennsylvania with about 600,000 acres of oak defoliated in 1970 (Map 4). Losses are estimated at 50 million trees following 6 years of repeated defoliation.

*A. argyrospilus* (Walker) and *C. albicomna* (Clemens) combined to cause more than 22,000 acres of defoliation in the three states.

### Fall and Spring cankerworms

*Alsophila pometaria* (Harris) and

*Paleacrita vernata* (Peck)

These species caused moderate to heavy defoliation on 10,000 acres in West Virginia. In Michigan, 4-8 square miles were reported defoliated on the Indiana border of Cass County. Small outbreaks were treated in Minneapolis and St. Paul, Minnesota. New Jersey reports an increasing trend in the southern portion of the state. Small, localized outbreaks were reported by several other states.

### Forest tent caterpillar

*Malacosoma disstria* (Hubner)

Aspen and northern hardwood defoliation by the forest tent caterpillar declined from 1971. About 22,000 acres were moderately defoliated in Pennsylvania. A 5 acre infestation was reported in Kalkaska County, Michigan. Although the forest tent caterpillar larvae could be commonly found in north-eastern Minnesota, no significant defoliation was found. The collapse in Minnesota was



Larva of the forest tent caterpillar.

caused by a failure in egg hatch, possibly due to unfavorable weather conditions in the spring.

### Eastern tent caterpillar

*Malacosoma americanum* (Fabricius)

Scattered unsightly tents of this insect are common wherever cherry grows. Heavy infestations were reported in 1972 only from West Virginia. Slight increased defoliation was noted in Maryland, Missouri and West Virginia.

### Aspen blotch miner

*Lithocolletis tremuloidiella* (Braun)

Heavy leaf mining was reported in western part of Upper Michigan and adjoining Wisconsin Counties. The damage does not appear serious to the trees, but the aesthetic values are affected.

### Birch casebearer

*Coleophora fuscedinella* (Zeller)

Moderate to heavy feeding was observed in some locations in northern Maine. Bud damage did not occur because larval feeding began late in season.

### Birch leaf miner

*Fenusa pusilla* (Lepeletier)

Browning of ornamental birch as the result of larval feeding was reported from several west central Wisconsin Counties. Forest birch browning also occurred in Clark County, Wisconsin.

### Bruce spanworm

*Operophtera bruceata* (Hulst)

In Main, sugar maple defoliation was high and reported in northern 2/3 of state, reaching 75% levels in limited areas.

### Cherry scallop shell moth

*Hydria prunivorata* (Ferguson)

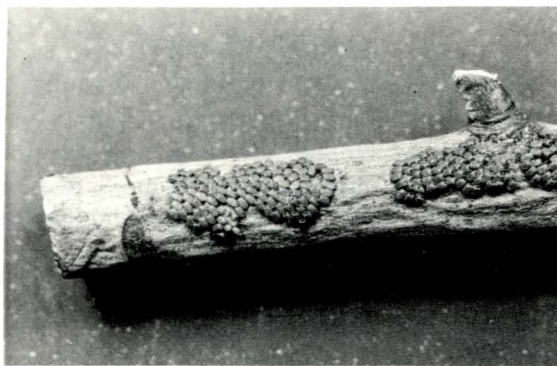
Webbing and browning of black cherry was common in the Northeast. Massachusetts had about 1/4 million acres with defoliation.

About 155,000 acres were defoliated in Pennsylvania, on the Allegheny N.F. Maryland reported a 600 acre infestation. In Michigan, a small outbreak continued in Missaukee County.

#### **Elm spanworm**

*Ennomos subsignarius* (Hubner)

Populations in Connecticut and New York declined apparently from natural control factors.



Elm spanworm egg mass on red oak twig.

#### **Fall webworm**

*Hyphantria cunea* (Drury)

Populations in the Northeast were moderate to high in Maine, Massachusetts and New Hampshire. Some sporadic defoliation was reported also from Missouri and Ohio.

#### **Locust leaf miner**

*Odontota dorsalis* (Thunberg)

Heavy locust defoliation was reported throughout southern Illinois. Local infestations occurred in Maryland.

#### **Maple leaf cutter**

*Paraclemensia acerifoliella* (Fitch)

About 6,650 acres of sugar maple were defoliated in Vermont. High populations were reported also from two counties in New Hampshire. Upward population trends are expected in both states in 1973.

#### **Maple trumpet skeletonizer**

*Epinotia aceriella* (Clemens)

Infestations reported in 1971 in Maine, Vermont, New York and Pennsylvania have apparently collapsed.

#### **Mountain ash sawfly**

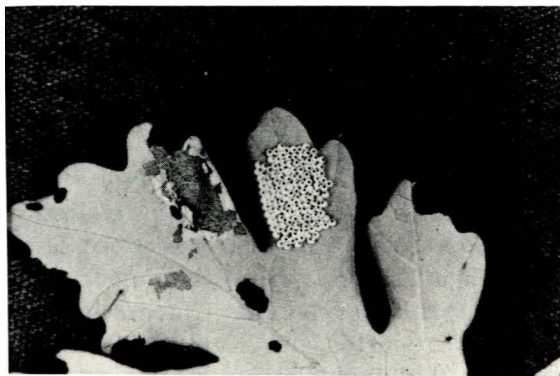
*Pristiphora geniculata* (Hartig)

Numerous reports of mountain ash defoliation were received from Langlade, Oneida and Vilas Counties, Wisconsin.

#### **Oranged-striped oakworm**

*Anisota senatoria* (J. E. Smith)

The orange-striped oakworm was reported by New Jersey to have caused several thousand acres of oak defoliation in four counties. The outbreak appears to be increasing. This species is a component of the late summer defoliating complex in Minnesota.



Orange-striped oakworm hatched egg mass on the under side of a red oak leaf.

#### **Oak skeletonizer**

*Bucculatrix ainshiella* (Murtfeldt)

Widespread skeletonizing was reported in northern half of New Jersey. Scattered, localized damage was reported in Rhode Island and Wisconsin.

#### **Post-oak locust**

*Dendrotettix quercus* (Packard)

The 1972 season generally was an "off" year for the locust populations in Wisconsin

and Michigan. A small outbreak population was reported from western part of lower Michigan.

#### **Satin moth**

*Stilpnotia salicis* (Linnaeus)

The outbreak reported in Maine during 1970 and 1971 has collapsed.

#### **Walkingstick**

*Diapheromera femorata* (Say)

Moderate numbers of walkingstick were present on about 1,000 acres of jack pine-

scrub oak type of Douglas County, Wisconsin. An increasing population is suspected in Lower Michigan.

#### **Walnut caterpillar**

*Datana integerrima* (Grote & Robinson)

Localized infestations in Missouri, Maryland and Ohio have subsided. A few colonies were observed in northwestern Iowa, but no serious defoliation was reported.

## **HARDWOOD — BARK-BEETLES AND OTHERS**

#### **Native elm bark-beetle**

*Hylurgopinus rufipes* (Eichhoff)

Studies in Wisconsin by the Dept. of Natural Resources show that the native elm bark-beetle has now been found in almost every county of the state. The native elm bark-beetle populations build-up is favored by standing dead trees, while slash is used lightly. No parasites were found for the native elm bark-beetles during the study. This vector of Dutch elm disease is the primary source for infection spread of *Ceratocystis ulmi* (Buism) Moreau, in the

northern extension of this disease in Wisconsin and probably also in Minnesota. The smaller European elm bark beetle (*Scolytus multistriatus* [Marsham]) is found mostly in the southern 2/3 of the states.

#### **A walnut weevil**

*Conotrachelus* sp.

Weevil larvae were collected on June 22 from succulent walnut seedling and sapling shoots in Richland County, Wisconsin. Damage appears like frost injury and distorts the form of the young stems.

## **CONIFER DEFOLIATORS**

#### **Spruce budworm**

*Choristoneura fumiferana* (Clemens)

In Maine 2.5 million acres of spruce-fir type were defoliated in 1972. New outbreaks are occurring and additional tree damage and mortality can be expected in 1973 if nothing is done. In 1972 the Maine Forestry Department in cooperation with the U.S. Forest Service, aerially sprayed 500,000 acres with Zectran<sup>7</sup> at the rate of 0.15 pounds per acre. The Minnesota outbreak covered 1.5

million acres of spruce-fir type. As a result of 3-5 years of severe defoliation, 10,000 acres of balsam fir saplings and reproduction have been killed on the Superior National Forest. A survey completed on the Kabetogama Peninsula (to be the Voyageurs National Park) shows an overall mortality of fir within the 12,000 acre survey area of 27% and 3% spruce mortality. Egg mass counts indicate lower budworm populations in 1973 and no suppression is planned. Two local infestations in Wisconsin have per-

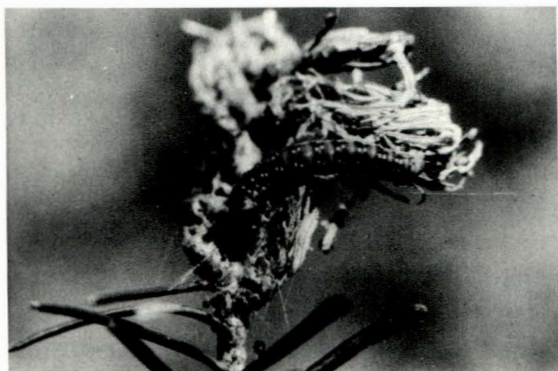


sisted for three and two years respectively, but are expected to decline in 1973. Spruce budworm defoliation occurred in the northern part of Lower Michigan in mature balsam fir stands and mortality is expected in the next few years. Fir mortality is occurring in two infested areas in Upper Michigan. Newly infested areas as well as expansions of old infestations have been found.

A proposal to treat 450,000 acres in northern Maine has been made to the Environmental Protection Agency. The treatment will be Zectran<sup>7</sup> at 0.15 lb. in 1 gal. deodorized kerosene per acre.



Laboratory crew at the Portage Maine Spruce budworm laboratory examining branches for budworm larvae.



Spruce budworm larva and damaged branch terminal of balsam fir.

### Jack pine budworm

*Choristoneura pinus pinus* (Freeman)

The northwestern Wisconsin outbreak has subsided and low egg counts indicate little likelihood of any serious defoliation in 1973.

Favorable results were obtained with a small test of mist-blower applied Dipel® (*Bacillus thuringiensis* Berliner) indicating further testing is desirable. In Upper Michigan, jack pine budworm is in the second year of an outbreak on about 1,500 acres. Populations in Lower Michigan are generally low and apparently the late June severe frosts further reduced the budworm populations. However, defoliation is increasing in five counties of the lower peninsula. Data in population trend collected during the past 5 years are being analyzed and a report should be available during 1973.

### Jack-pine sawfly

*Neodiprion pratti banksianae* (Rohwer)

The Upper Michigan outbreak subsided midway through larval development this year. Adverse weather probably was a factor; however, host mortality occurred as a result of last year's severe defoliation. About 30,000 acres of jack pine was again heavily defoliated in one area although populations were lower than last year.

### European pine sawfly

*Neodiprion sertifer* (Geoffroy)

Larval collections from Grant, Kenosha, Racine and Walworth counties in Wisconsin are the first records for this state. Apparently the sawfly had been present in Wisconsin longer than one year and the defoliation was mistakenly attributed to another species. The sawfly is chiefly a problem in Christmas tree plantations and ornamental plantings in southern Lower Michigan. Scattered heavy defoliation was observed in Ohio and Missouri.

A small field test with *Neodiprion sertifer* virus is planned in cooperation with Wisconsin Department of Natural Resources and the University of Wisconsin. The Northeastern Forest Experiment Station (Hamden, Conn. Laboratory) will provide the virus stock for the treatment.

### Loblolly pine sawfly

*Neodiprion taedae linearis* (Ross)

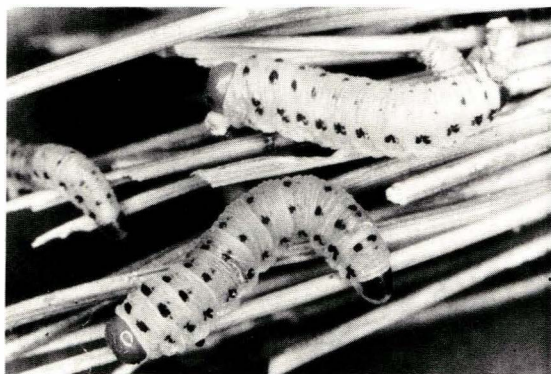
Moderate to heavy defoliation was reported for the southeastern portion of the

Ozarks in Missouri. Illinois reports an increase in population of this insect, and the sawfly is expected to be widespread throughout the state in 1973.

### **Redheaded pine sawfly**

*Neodiprion lecontei* (Fitch)

Populations were generally low in 1972. However, 3,140 acres of red pine in New York and 200 acres in several locations in Vermont were defoliated. A few red pine plantations in Lower Michigan had damaging sawfly populations; however, most observations were of ornamentals and roadside trees in Lower Michigan and Wisconsin. Field work on Impact studies conducted in Michigan infestations for the past 2 years will be continued in 1973. Population has declined in some of the study plots so that tree recovery should be recorded in 1973. Some phases will be completed this season. An ancillary study of reinfestation in a treated area indicates rapid reinfestation.



Redheaded pine sawfly larvae.

### **Red pine sawfly**

*Neodiprion nanulus nanulus* (Schedl)

The degree of defoliation by this insect varied over 20,000 acres of jack pine in Wisconsin. Of this acreage, 6,000 acres of pine are almost completely stripped of foliage. The outbreak is in progress for the second year.

### **Larch sawfly**

*Pristiphora erichsonii* (Hartig)

Populations of the larch sawfly are generally low in the Lake States; however, scattered stands in Wisconsin and one

county of eastern Upper Michigan were heavily defoliated. In Minnesota defoliation averaged 30 to 50 percent over the extensive larch type.

### **Yellowheaded spruce sawfly**

*Pikonema alaskensis* (Rohwer)

Populations of this insect are increasing across northern Minnesota. The sawfly is a pest of roadside, ornamental and plantation spruce.

### **Hemlock looper**

*Lambdina athasaria athasaria* (Walker)

[Reported last year as *L. fiscellaria* (Guenée)]

No further tree defoliation was observed in the area of southeastern Massachusetts defoliated last year, however, several thousand acres of hemlock were severely defoliated by this insect in the northeastern part of the state.

### **Pine looper**

*Lambdina athasaria pellucidaris* (G & R)

The 1971 11,000 acres of defoliation on Cape Cod by this insect increased to 42,740 acres of pitch pine visibly defoliated in 1972. Aerial treatment with malathion was used on 13,100 acres. Also pine defoliation in New Jersey increased from 1,000 acres in 1971 to several thousand acres in 1972.

### **Bagworm**

*Thyridopteryx ephemeraeformis* (Haworth)

This insect continues to damage ornamental plantation conifers in Illinois, Missouri and Ohio. A decline in damage is expected in Illinois and Ohio in 1973, but damage in Missouri is expected to remain the same.

### **Arborvitae leaf miner**

*Argyresthia thuiella* (Packard)

Population levels of this and other leaf miners appear high in Maine, but populations were lower than last year in Vermont.



Heavy infestations of the arborvitae leaf miner were reported on ornamental and plantation trees in New York.

#### **Nantucket-pine tip moth**

*Rhyacionia frustrana* (Comstock)

Infestations continue to decline on Cape Cod where pitch pine is the host species.

#### **Pine tussock moth**

*Dasychira plagiata* (Walker)

The high populations expected in 1972 in east central Minnesota and northwestern Wisconsin failed to materialize due to disappearance of overwintering larvae. The Minnesota control project scheduled for 1,000 to 1,500 acres of jack pine was canceled.

## **CONIFER — INSECTS (OTHER)**

#### **Red pine scale**

*Matsucoccus resinosae* (Bean & Godwin)

Populations appear to be static in New Jersey, New York and Connecticut. Control involves removal of infested trees. This program has been completed on the Wanaque Reservoir, Passaic and Bergen Counties, New Jersey. Some infected trees on private property are to be removed as soon as approval is reached with private owners.

#### **Saratoga spittlebug**

*Aphrophora saratogensis* (Fitch)

A 200 acre county-owned red pine plantation in Wisconsin was successfully treated with malathion at the rate of one half pound per acre. Populations in Upper Michigan are generally declining in plantations where the trees are no longer of a susceptible tree size, but spittlebug populations are increasing in plantations where trees are reaching the lower limit of susceptibility. Several 50-75 acre red pine plantations in Maine had tree mortality ranging as high as 80% and more. A small infestation was identified in a Red Lake Indian Reservation plantation in northern Minnesota.

#### **Balsam woolly aphid**

*Chermes piceae* (Ratzenberg)

The 14,000 acres of scattered tree mortality in Vermont reported in 1971 increased to over 27,000 acres in 1972. The infestation is moving northward.

#### **Pine root collar weevil**

*Hylobius radialis* (Buchanan)

Young pine plantations particularly Scotch pine are still being seriously affected in western Lower Michigan, and damaged to a lesser extent in northern Lower Michigan. This insect is the major cause of losses in Wisconsin Scotch pine Christmas tree plantations in the west central counties. Damage is common in the east central counties of Wisconsin.

#### **Pine root weevil**

*Hylobius rhizophagus*  
(Millers, Benjamin & Warner)

Up to 90 percent tree mortality was found in some Scotch pine plantations attacked by both pine root weevil and root collar weevil in Wood and Adams Counties, Wisconsin. The root weevil is destroying some jack pine plantations and injuring mixed pine plantations. Pure red pine plantations in the infested area are not damaged, but red pine growing in association with volunteer jack pine is. This represents an increasing hazard to red pine in mixed plantations and indicates a greater attack on natural-seeded jack pine than was previously known.

#### **Southern pine beetle**

*Dendroctonus frontalis* (Zimmerman)

The southern pine beetle populations declined substantially from the 1971 levels, however, localized loblolly pine mortality oc-



curred on the Delmarva Peninsula in Delaware and Maryland.

**White pine weevil**

*Pissodes strobi* (Peck)

The white pine weevil is a perennial problem in plantation and open grown white,

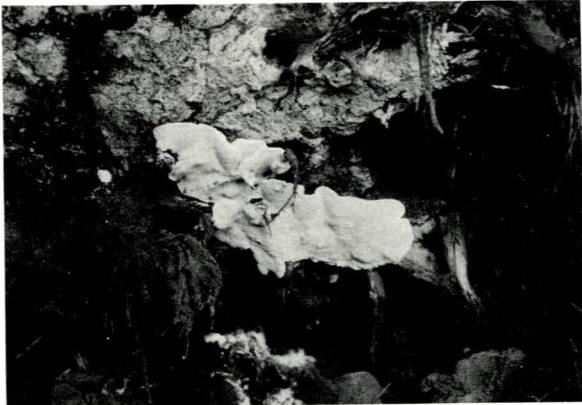
jack, red and Scotch pines and white and Norway spruce. Weevil populations do not have the large yearly fluctuations characteristic of many other insects. Weevil damage is increasing in parts of the Lake States with ten percent of the trees infested in one Wisconsin red pine plantation.

# STATUS OF DISEASES

## Annosus root rot

*Fomes annosus* (Fr.) Cke.

Severe damage in many conifer plantations is occurring in southern New England, but becoming less important elsewhere. In Indiana the disease has nearly disappeared from some known infection centers.



*Fomes annosus* fruiting bodies on roots of windblown pine.

## White pine root decline

*Verticicladiella procera* Kendrick

This disease is becoming increasingly important in West Virginia on poorly drained sites. Most of the infections are in young stands, though some sawtimber is affected. The fungus is also causing damage in Ohio, Pennsylvania and southern Indiana.

## Armillaria root rot

*Armillaria mellea* Vahl Ex. Fr.

Armillaria root rot is seriously damaging 60-80 year old red spruce stands on the Green Mountain National Forest in Vermont. Losses up to 40% have occurred in the stands which have been overstocked for at least 10 years. The drought of the mid-sixties undoubtedly contributed to the stress. A similar problem exists in 33 year-old jack pine stands on the Nicolet National Forest in Wisconsin. In this latter outbreak, the triggering factor is suspected to be defoliation by the jack pine budworm 3-4 years ago.

## Oak wilt

*Ceratocystis fagacearum* (Bretz) Hunt.

The disease appears to be static over most of its range (Map 5). In West Virginia, about 10% fewer trees were treated in 1972 than in 1971. Most of the reduction is in the northeast panhandle, with a static condition in the rest of the state.

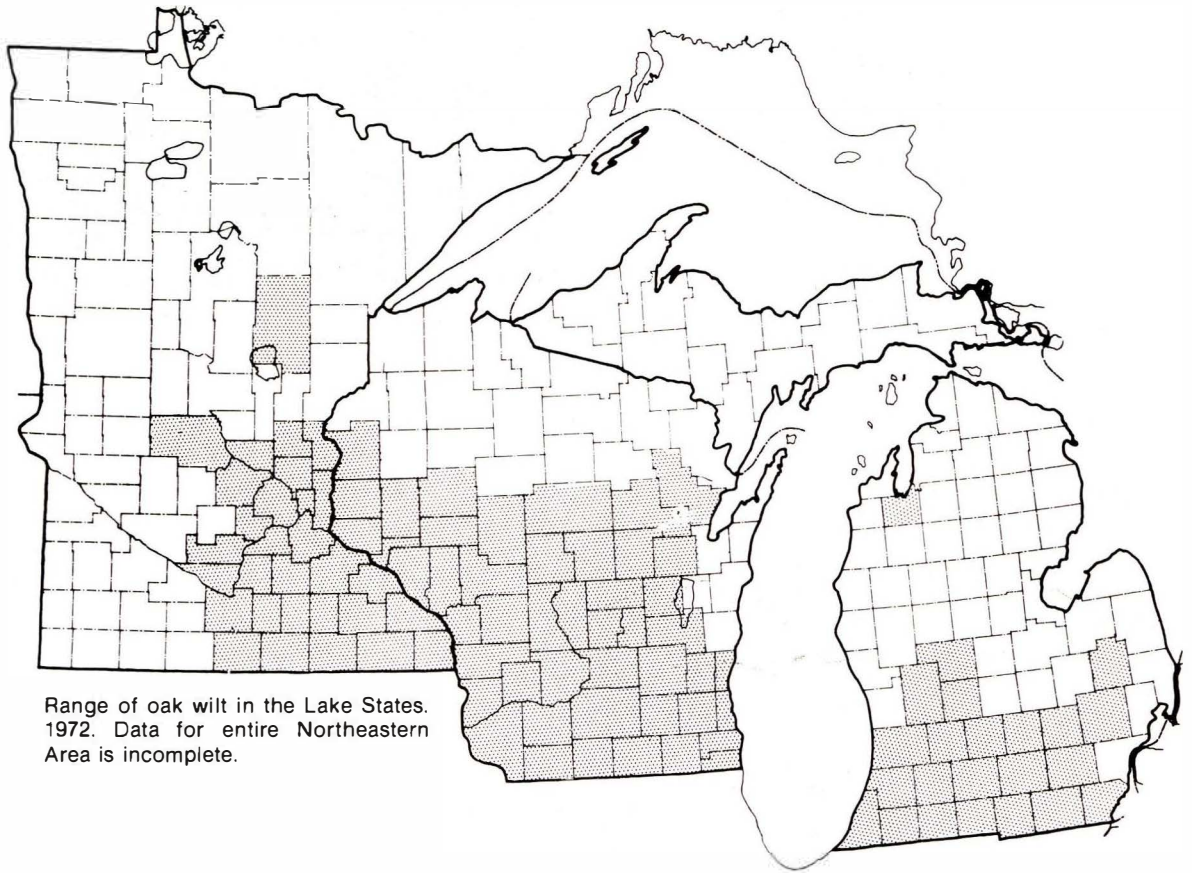


Red oak killed by *Ceratocystis fagacearum*.

## Dutch elm disease

*Ceratocystis ulmi* (Buism) C. Moreau.

The disease was more severe this year in northern Indiana, West Virginia and parts of Pennsylvania. Diseased elms have been found in two additional counties in Minnesota: (Big Stone, Carver), and three additional counties in Wisconsin: (Barron, Polk, Washburn). The disease continues to be the most serious in the Northeastern Area, its devastation declining only where elms have become so scattered that few are available for infection.



Range of oak wilt in the Lake States.  
1972. Data for entire Northeastern  
Area is incomplete.

### **Anthracnose**

Species of *Gnomonia*, *Gloeosporium*,  
*Marssonina*, and others

Black walnut in parts of Pennsylvania was completely defoliated and some damage occurred in Indiana. Various anthracnoses appeared elsewhere throughout the Northeastern Area, including a rather spectacular, but apparently harmless, outbreak of maple anthracnose in northern Wisconsin.

### **Brown spot needlecast**

*Scirrhia acicola* (Dearn) Siggers

Brown spot has been found in Scotch pine Christmas tree plantations in Minnesota, Wisconsin, Iowa, and Missouri (Map 6). It has also been found on red pine in three

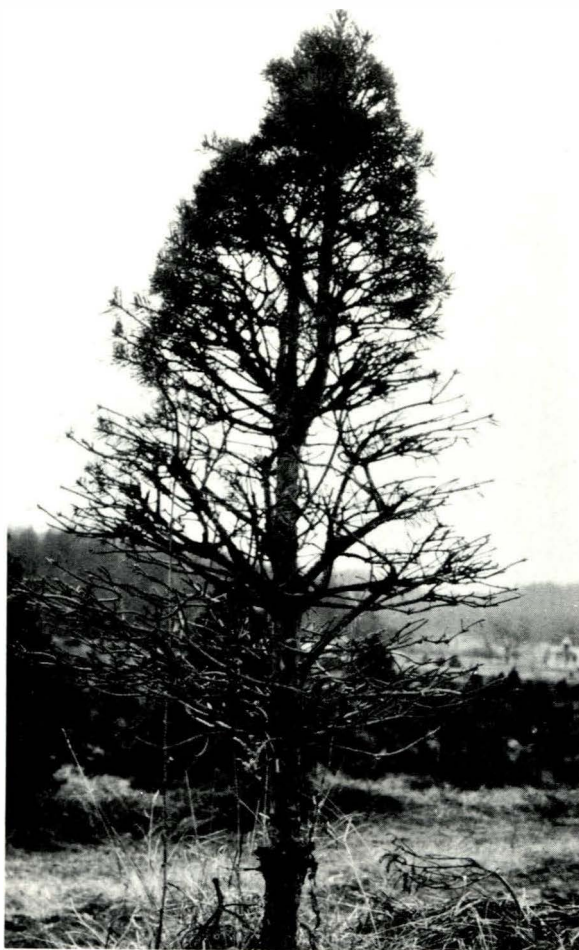
Wisconsin counties: (Grant, Jackson, Green) and in each case, associated with heavily infected Scotch pine trees. Control with fungicide spray (Bordeaux mixture) has been highly successful.

### **Rhizosphaera needlecast**

*Rhizosphaera kalkhoffii* Bub

This disease has been found on Colorado blue spruce Christmas trees or windbreaks around nurseries in Minnesota, Wisconsin, Michigan, and Indiana. One Minnesota plantation has 20,000 infected trees, many which will be unmerchantable as Christmas trees. The North Central Forest Experiment Station is working on a control.





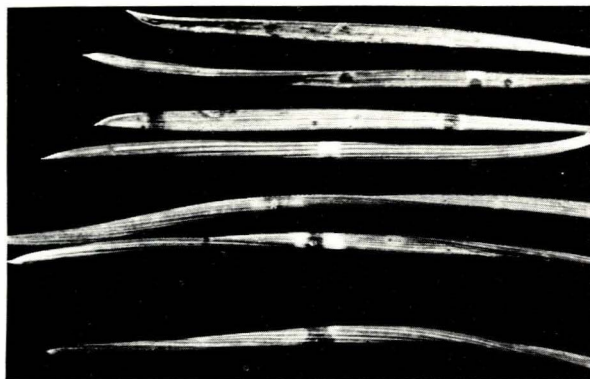
Scotch pine Christmas tree severely damaged by *Scirrhia acicola*.

### **Lophodermium needlecast**

*Lophodermium pinastri*  
(Schr. Ex. Fr.) Chev.

This disease has been found in nurseries in Minnesota, Wisconsin, Michigan, Pennsylvania and West Virginia. It has been found in Scotch pine Christmas tree plantations in the above states, plus Indiana, Ohio, Connecticut, and Vermont.

A survey of Christmas tree plantations in Michigan showed that 65 percent of the Scotch pine plantations were infected with *Lophodermium*. The survey, conducted by the Michigan Department of Agriculture, and St. Paul Forest Pest Management, covered 5,000 Christmas tree plantations. Maneb<sup>7</sup> has been effective in controlling this disease.



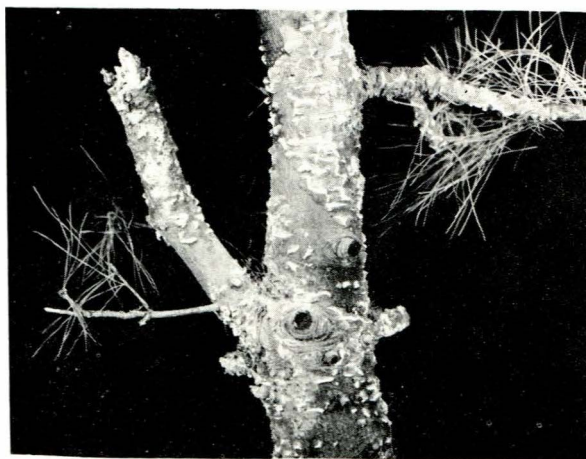
*Lophodermium pinastri* needle spots on Scotch pine.

### **White pine blister rust**

*Cronartium ribicola* Fischer

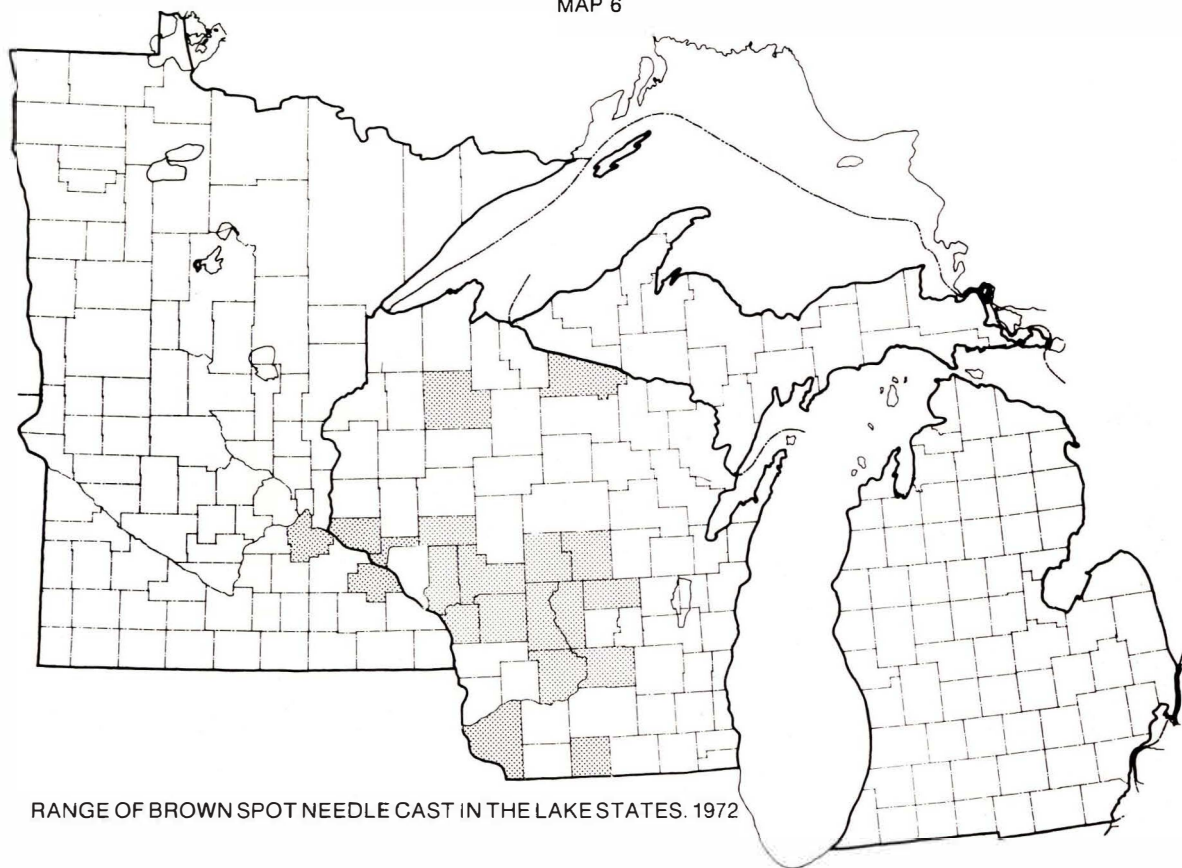
Incidence of blister rust is low in many areas of the Northeastern Area. Primarily because of this low incidence, there is only one National Forest with an active control program: the Monogahela. Michigan, Pennsylvania, and Massachusetts have dropped their cooperative control programs, (again, mainly because of low incidence).

A sampling system designed to monitor the white pine blister rust trend is being evaluated in the Upper Peninsula, Michigan. The system was developed by the Michigan Department of Agriculture, Forest Pest Management, St. Paul, and North Central Forest Experiment Station, St. Paul. This new sampling method was designed in order to obtain a sound estimate of infection for a



Aecia spore stage of white pine blister rust on a white pine stem.

MAP 6



RANGE OF BROWN SPOT NEEDLE CAST IN THE LAKE STATES. 1972

large geographic area and to obtain the information faster than with previous systems.

Pruning has become a major element in the control of blister rust in the Lake States. Guidelines for this control measure have been developed. They include: minimum stocking, minimum annual lethal infection, minimum unweeviled white pine per acre, maximum trees per acre to prune, and height of pruning.

### **Scleroderris canker**

#### *Scleroderris lagerbergii* Gremmen

Approximately 30 major infection centers are known in Northeastern New York. In the Adirondacks, entire Christmas tree plantations of both red and Scotch pine have been destroyed. In addition, the disease is causing mortality in older and larger trees than has been reported elsewhere in North America. Scotch pine 60 feet tall and red pine 40 feet tall are being killed. In the Lake States,

spread and mortality appear to be at about the same rates as in the previous five years. Some infection appeared in a Michigan nursery in spite of heavy applications of maneb.<sup>7</sup>

*Scleroderris lagerbergii* apothecia on red pine.





### Hypoxylon canker of aspen

*Hypoxylon pruinaum* (Klotsche) Cke.

A 1971 survey of aspen over its entire range in the Lake States showed infection present in an average of 12 percent of the live aspen. Infection within stands ran up to 40 percent. Value of the loss at harvest is predicted to exceed 4 million dollars. The survey was done by Michigan State University in cooperation with the U.S. Forest Service.



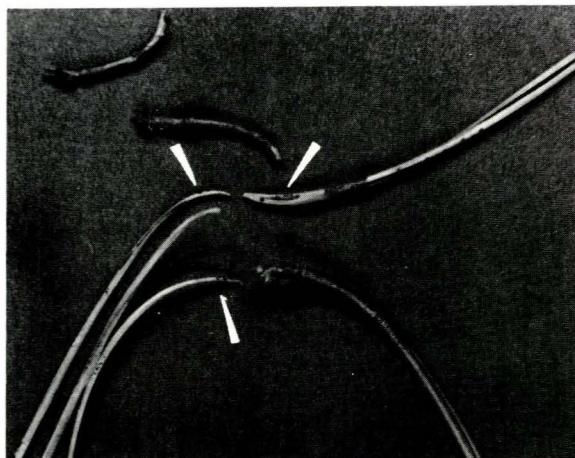
*Hypoxylon pruinaum* canker on a young aspen stem.

### Sirococcus shoot blight of red pine

*Sirococcus strobilinus* (Preuss)

The shoot blight of red pine, locally called "Deerskin droop," was identified as being caused by *Sirococcus strobilinus*. A great increase in disease incidence occurred within infected stands, which comprise approximately 20,000 acres in the Lake States, in

1972 (Map 7). Most serious damage occurs in young stands with an overstory of infected sawtimber-sized trees. Large trees are also affected, however; some severely. Infection has been found in a windbreak in a Michigan nursery, but none of the planting stock (sprayed with maneb<sup>7</sup>) appears to be affected.



Pycnidia of the shoot blight, *Sirococcus strobilinus*, at the base of red pine needles.

### Air pollution damage

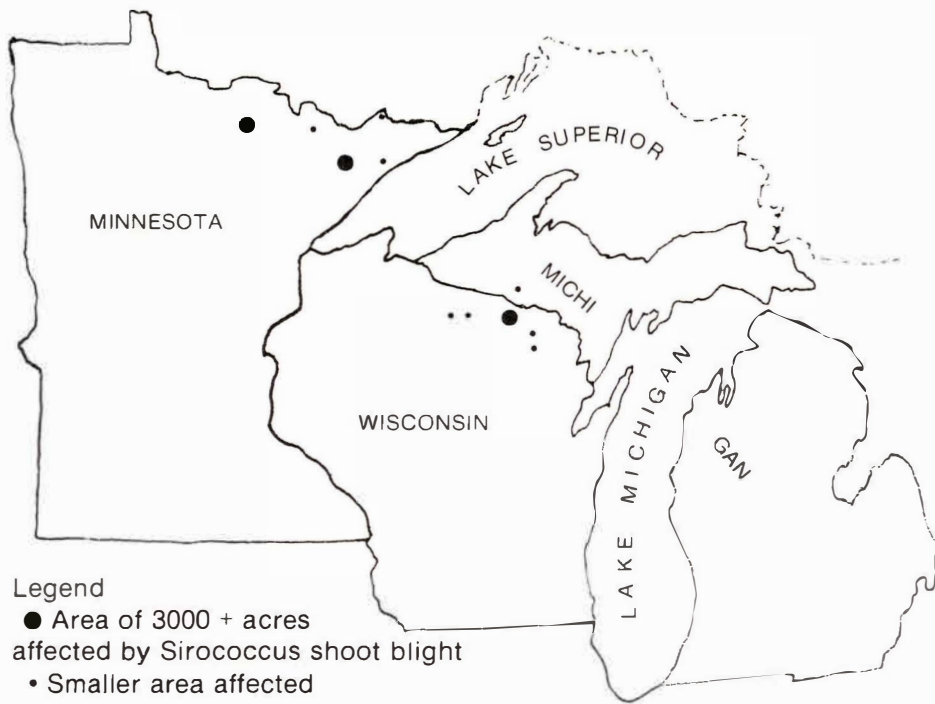
Some damage to pecan and walnut flowers occurred in southern Indiana, possibly caused by flourides. White pine needles were browned, on 3-10% of the trees, in an area along a line between Scranton, Pennsylvania, and White Sulphur Springs, West Virginia. Signs of chronic oxidant damage (needle mottling) was also visible on white, Scotch and red pine. For some reason, perhaps movement of ozone-red layers of the atmosphere, much of the browning occurred just after the passage of Hurricane Agnes.

### Weather damage

Late spring frosts in mid-June caused extensive early foliage kill of many hardwood species and spruce across the northern areas of Michigan, Wisconsin and Minnesota. A severe ice storm in parts of west central Michigan caused severe branch and tree loss.



MAP 7



DISTRIBUTION OF SIROCOCCUS SHOOT BLIGHT  
IN THE LAKE STATES, 1972